UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,399	02/25/2002	Theodore H. Fedynyshyn	101328-0165	5837

21125 7590 07/14/2004

NUTTER MCCLENNEN & FISH LLP
WORLD TRADE CENTER WEST
155 SEAPORT BOULEVARD
BOSTON, MA 02210-2604

EXAMINER	
CHU, JOHN S Y	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/082,399	FEDYNYSHYN, THEODORE H.	
	Examiner	Art Unit	
	John S. Chu	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23-26* is/are allowed.

6)☒ Claim(s) *1, 10-15, 17 –22 and 27* is/are rejected.

7)☒ Claim(s) *2-9 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to the RCE filed July 2, 2004.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 10-15, 17 –22 and 27 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by NAGASHIMA et al.

The claimed invention is drawn to the following:

> 1.(Currently Amended) A photoresist composition, comprising
> a resin binder, and
>
> an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group, said coated particles being distributed within the resin.

> 17. (Currently Amended) A method of processing a semiconductor substrate, comprising:
>
> coating the substrate surface with a photoresist composition comprising a resin binder, and an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group, said coated particles being dispersed within said resin binder,
>
> exposing selected portions of the coated surface to an activating radiation to cause a chemical transformation in the exposed portions,
>
> removing either the radiation-exposed or unexposed portions of the photoresist composition, and
>
> plasma-etching the substrate surface to generate a pattern thereon.

18. (Currently Amended) A method of processing a semiconductor substrate, comprising:

coating the substrate surface with a photosensitive resist comprising a resin binder, and an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group, said coated particles being dispersed within said resin binder,

exposing selected portions of the coated surface to an activating radiation to cause a chemical transformation in the exposed portions,

removing either the radiation-exposed or unexposed portions of the resist composition, and

exposing the substrate surface to an ion beam to implant a selected dose of the ion in the portions of the substrate from which the photoresist coating is removed.

19. (Currently Amended) A method of processing a semiconductor substrate, comprising:

coating the substrate surface with a multi-layer photoresist composition having at least one layer comprising a resin binder, and an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group, said coated particles being dispersed within said resin binder,

exposing selected portions of the coated surface to an activating radiation to cause a chemical transformation in the exposed portions,

removing either the radiation-exposed or unexposed portions of the photoresist composition, and

plasma-etching the substrate surface to generate a pattern thereon.

20. (Currently Amended) A photoresist composition, comprising ~~The method of claim 1,~~

a resin binder, and

an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group,

wherein said moiety is attached to said particles by one or more covalent bonds.

23. (Currently Amended) A photoresist composition, comprising ~~The method of claim 1,~~

a resin binder, and

an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group,

wherein said particles have an average size less than about 10 nm.

24. (Currently Amended) A positive photoresist comprising a resin binder and an encapsulated inorganic material comprising core particles having an average size ranging from about 1 nm to about 50 nm, wherein said particles are base-soluble and the photoresist is sufficiently base soluble upon activation by radiation to function as a positive resist.

27. (New) A photoresist composition, comprising

a resin binder, and

an encapsulated material comprising inorganic core particles at least partially coated with a moiety having a protected acidic group,

wherein said moiety is adsorbed onto said particles.

NAGASHIMA et al discloses a light solublizable composition comprising a quinonediazide compound, an alkali-soluble resin and fine particles of silica wherein the silanol groups on the silica have been modified with a reactive silane coupling agent which include chromic acid methacrylate and isocyanate and diisocyanate. These groups actually meet the claimed invention as recited in claim 1 wherein the particles have acid protected groups as claimed, see column 3, lines 2-64. Also Example 1 and 2 anticipates the claimed particles wherein the hydroxy groups of the hydrophilic silanol groups are replaced by hydrophobic methyl groups. These groups are not acid-labile groups as intended in the specification and as recited in the dependent claims, however the rejected claims in the current paragraph fall within the scope of an acid protected group as recited in the independent claims recited above.

None of the aforementioned claims are allowed.

3. Claims 2-9, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the prior art references of record disclose the acid-labile groups as recited in the claims above. The art of NAGASHIMA et al fails to disclose acid-labile groups on the silica.

4. Claims 23-26 are allowed.

None of the prior art references of record disclose the claimed particle size as recited in claim 23 or the base-soluble particles which are present after activation by radiation.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

The fax phone number for the USPTO is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PMR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John S. Chu
Primary Examiner, Group 1700

J.Chu
July 11, 2004